

ent degrees of force, I have found that the most violent wind traverses scarcely 60 miles an hour. For example, on the 11th of August, 1705, the violence of the wind excited such a tempest that it almost overturned the windmill itself near the spot where I made my observations. [The different degrees of the force of the winds, as has just been seen, I have for the most part noted by these figures: 0, 1, 2, 3, 4, 5, 6, up to 10, 15, or still higher degrees.] Now I have estimated that the force of the above indicated wind answers to about 12 or 14 of these degrees. And from very many reiterated experiments I have concluded that that tornado traversed about 33 feet in a half second, or 45 miles in an hour; hence I gather that the fleetest and most tempestuous winds (that violent wind which raged in the month of November, 1703, not being excepted) do not traverse more than 50 or 60 miles an hour.

After we have measured the velocity of the rapid winds, it is not difficult to conjecture what may be the velocity of less rapid ones; for I have also marked the course of these, and from various experiments I have convinced myself that some of them accomplished 15, some 13, others many less miles per hour; while some are propagated with such a slow motion that they move scarcely a single mile an hour. Moreover, other winds are so sluggish that one may easily outstrip them while making a journey on horseback or on foot. This fact is apparent to our senses, for when we arrest our steps we perceive a soft breeze gently fanning us, but if we advance with it we feel none at all; while if we quicken our pace instead of a breeze accompanying us and blowing in the same direction with our movement, we plainly feel the air resisting us, and blowing full in our faces. Likewise when the atmosphere is entirely quiescent and stagnant, if we chance to be walking or riding on horseback, we then perceive a gentle breeze pressing against us, with such degrees of force, in fact, as correspond to the rates of our own motion. And a breeze of wind or current of air is borne with the same rate of motion or velocity when it presses against us with an equal impetus as we stand still, or linger in our track.

From these observations about the velocity of winds very many things, not without utility, might be noted, but especially might we assign in view of them, one reason why the mercury rises and falls for such a long time before clear weather or rain sets in.

But I will omit these considerations as being foreign to my purpose, and this only will I observe as to sounds, to wit, that while their motion is accelerated by wind it is plain that those parts of the atmosphere by which sounds are impressed or propagated are not the same as those from which winds are blown, but certain other more ethereal and volatile parts, as one may suppose. For the fleetest winds do not pass through more than 60 miles in an hour, but sounds travel more than seven hundred thousand paces, or 778 miles in the same time.

But if it be objected that winds do accelerate or retard sounds it is to be answered that this does not only proceed from the current or tendency of the windy particles alone, but rather from the conjoint and cooperating motion of all the particles of the atmosphere, both the thicker and the ethereal. If the direction of this course or motion favors the waves of sound it is altogether in accordance with probability that the impulse of sounds should be accelerated by this cause, but if the direction is adverse that, the impulse should be retarded.

Having shown that the velocity of sound under ordinary conditions of the atmosphere in England averages 1,142 feet per second, Derham enumerates many practical applications of this knowledge, and concludes: "Finally, in this way the height of thunderclouds and the distance of the thunder and lightning itself may be easily ascertained."

THE CHINOOK IN OREGON.

The morning map of Thursday, December 3, at Portland, Oreg., contains the following predictions by B. S. Pague, Local Forecast Official:

Chinook winds are prevailing over Washington, Oregon, Idaho, and Montana this morning. The temperature is from 46° to 50°, west of the Cascades, and from 24° to 22° to the east of them.

The storm area extends from the ocean off northwestern Washington over British Columbia and northern Washington. An area of high pressure is central about Salt Lake, and the flow of air from the high to the low causes the chinook winds by dynamic heating.

Chinook winds are not warm winds from the ocean, but air made warm by the compression produced by the flow from the mountain heights of Nevada, Utah, and southern Idaho, to the lower lands extending north-northeastward and northwestward to the area of low barometric pressure. The map this morning shows the distribution of atmospheric pressure necessary to produce chinook winds over the northwestern portions of the United States. These winds are most welcome for they will clear the snow blockades which have closed the railroads and will remove the snow from the stock ranges.

Warm chinook weather will prevail for the next thirty-six hours.

The chinook prevailing this (Thursday) morning was indicated in

the Tuesday morning's report, and was telegraphed out Wednesday morning.

In the above paragraph Mr. Pague has used the word chinook in its ordinary meteorological acceptance. It would be interesting to learn whether the popular usage in Oregon, Washington, and British Columbia agrees with that of the meteorologist.

MEXICAN CLIMATOLOGICAL DATA.

In order to extend the isobars and isotherms southward so that the students of weather, climate and storms in the United States may properly appreciate the influence of the conditions that prevail over Mexico the Editor has translated the following tables from the current numbers of the *Boletín Mensual* as published by the Central Meteorological Observatory of Mexico. The data there given in metric measures have been converted into English measures. The barometric means are as given by mercurial barometers under the influence of local gravity, and therefore need reductions to standard gravity, depending upon both latitude and altitude; the influence of the latter is rather uncertain, but that of the former is well known. For the sake of conformity with the other data published in this REVIEW these corrections for local gravity have not been applied. One additional station, Topolobampo, is published at the end of Table II.

Mexican data for November, 1896.

| Stations. | Altitude. Feet. | Mean barometer. Inch. | Temperature. | | | Relative humidity. % | Precipitation. Inch. | Prevailing direction. | |
|----------------------------|--------------------|--------------------------|--------------|------|-------|-------------------------|-------------------------|-----------------------|----------|
| | | | Max. | Min. | Mean. | | | Wind. | Cloud. |
| Campeche | | | ° F. | ° F. | ° F. | | | | |
| Colima (Seminario) .. | 1,600 | 28.26 | 90.5 | 57.7 | 76.3 | 70 | 0.39 | ws. | s. & w. |
| Colima | | | | | 77.7 | | | | |
| Guadalajara (O. d. E.) | 5,141 | 25.00 | 77.7 | 39.4 | 64.8 | 80 | 3.44 | se. | w. & nw. |
| Guajajuato | 6,761 | 23.70 | 79.2 | 49.3 | 62.2 | 58 | 1.44 | ene. | sw. |
| Jalapa | 4,757 | 25.56 | 83.5 | 43.0 | 66.0 | 84 | 5.21 | n. | |
| Lagos | 6,275 | 24.17 | 77.9 | 39.0 | 60.3 | 66 | 1.70 | nw. | nw. |
| Leon | 5,901 | 24.32 | 78.3 | 43.9 | 61.7 | 62 | 1.06 | ssw. | w. |
| Magdalena (Sonora) .. | | | | | 64.2 | | 0.28 | ne. | n. |
| Mazatlan | 25 | 29.91 | 84.6 | 62.1 | 76.6 | 77 | 0.00 | nw. | sw. |
| Merida | 50 | 29.92 | 94.3 | 67.6 | 78.1 | 81 | 4.62 | ne. | e. |
| Mexico (Obs. Cent.) .. | 7,489 | 23.09 | 72.0 | 47.3 | 58.5 | 68 | 0.80 | nw. | ne. |
| Mexico (E. N. de S.) .. | 7,480 | | | | | | | | |
| Morelia (Seminario) .. | 6,401 | 23.98 | 75.2 | 46.9 | 58.5 | 73 | 1.31 | ssw. | w. |
| Oaxaca | 5,164 | 25.08 | 84.7 | 49.1 | 67.3 | 65 | 2.93 | nnw. | ne. |
| Pabellon | 6,312 | | | | | | | | |
| Pachuca | 7,956 | 22.55 | 78.4 | 39.2 | 55.9 | 73 | 0.40 | ne. | ne. |
| Puebla (Col. d. Est.) .. | 7,118 | | | | | | | | |
| Puebla (Col. Cat.) | 7,112 | 23.38 | 76.1 | 48.2 | 61.3 | 66 | 1.61 | e. | ne. |
| Queretaro | 6,070 | | | | | | | | |
| Saltillo (Col. S. Juan) .. | 5,377 | 24.93 | 77.5 | 24.4 | 58.6 | 77 | 2.40 | n. | n. |
| San Luis Potosi | 6,202 | 24.16 | 74.3 | 40.1 | 61.7 | 67 | 1.28 | e. | w. |
| Silao | 6,063 | 24.30 | 73.8 | 50.7 | 64.6 | 69 | 0.72 | w. & nw. | w. |
| Tacumbaro | | | | | | | | | |
| Tacubaya (Obs. Nac.) .. | 7,620 | | | | | | | | |
| Tampico (Hos. Mil.) .. | 38 | | | | | | | | |
| Tehuacan | 5,453 | | | | | | | | |
| Toluca | 8,612 | 21.91 | 70.2 | 38.8 | 52.5 | 76 | 1.34 | w. | |
| Trejo (Hac. Sil., Gto.) .. | 6,011 | | | | | | 0.91 | | |
| Veracruz | 48 | 30.02 | 86.9 | 61.0 | 75.4 | 77 | 9.84 | nne. | nne. |
| Zacatecas | 8,015 | 22.54 | 76.6 | 26.6 | 57.0 | 67 | 0.43 | sw. | sw. |
| Zapotlan (Seminario) .. | 5,125 | | | | | | | | |

In order that there may be no doubt as to the altitudes of the barometers at these Mexican stations, the Editor has solicited some information from Professor Bárcena, as mentioned on page 421 of the previous number of the REVIEW, and takes pleasure in publishing the following reply:

CENTRAL METEOROLOGIC-MAGNETIC OBSERVATORY,

Mexico, January 15, 1897.

Prof. CLEVELAND ABBE,

Weather Bureau, Washington, D. C.

DEAR SIR: In the absence of Prof. Mariano Bárcena, Director of this Bureau, I have the honor to answer your letter of January 6.

All the elevations of the table are accurately determined and the barometers are in the best possible condition. The altitudes given those of the cisterns of the barometers. In Mexico this altitude is 17.5 meters above the ground; in Puebla, 15.0; in Mazatlan, 7.5; in Merida, 8.5; in other localities the barometers are a very few meters